

Trend Study 21B-14-03

Study site name: Meadow Creek.

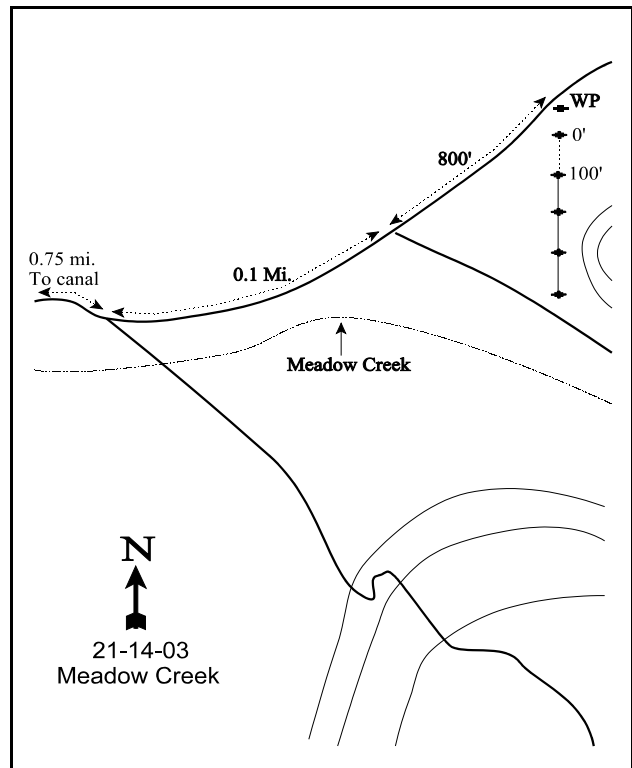
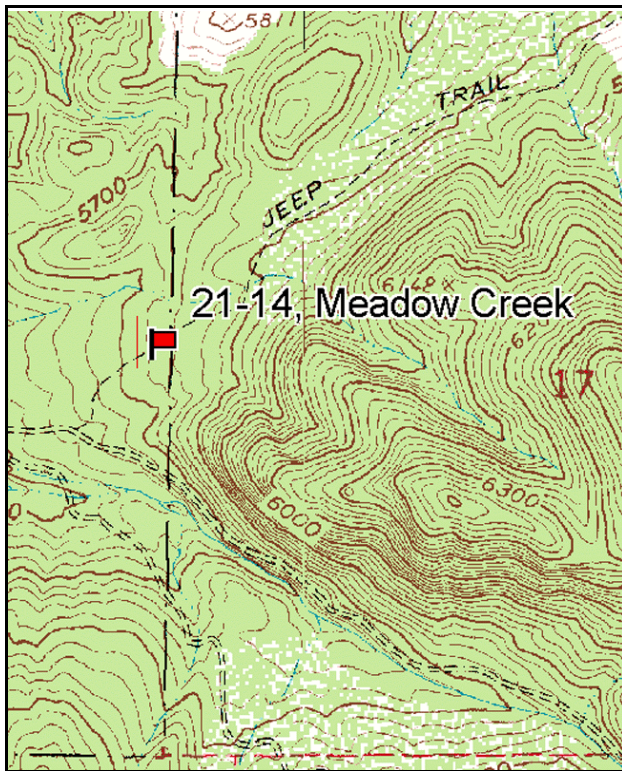
Vegetation type: Chained, Seeded P-J.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the corner of 100 North and 200 East in Meadow, travel 0.5 miles north to the Meadow Creek Road. Turn right and go 2.75 miles east. Drive across the canal and continue 0.75 miles to a fork in the road. Turn left and go 0.1 miles to another fork. Turn left and drive up about 0.15 miles (800 feet) to a rebar witness post on the right side of the road. The baseline starts 100 feet south of the witness post. The 0-foot baseline stake is a rebar with browse tag #7110 attached.



Map Name: Fillmore

Diagrammatic Sketch

Township 22S, Range 4W, Section 17

GPS: NAD 27, UTM 12S 4306160 N, 384045 E

DISCUSSION

Meadow Creek - Trend Study No. 21-14

This study samples critical deer winter range on the foothills at the mouth of Meadow Canyon. The transect and surrounding BLM land is an important winter concentration area for big game. Slope varies from 4-8% and drains to the west. Elevation of the site is about 5,900 feet. The area was two-way chained and seeded in 1966, but juniper again dominates the overstory. A variety of preferred browse are found on the site including mountain big sagebrush, cliffrose, and bitterbrush. Deer use throughout the area has been moderate to heavy for decades. This is documented by pellet group counts at the DWR Meadow Creek pellet group transect which has an annual average of 61 deer days use/acre (151 ddu/ha) between 1980 and 1985 (Jense et al. 1985). This trend continued with average deer days use/acre increasing to 67 (165 ddu/ha) between 1985 and 1991 (Jense et al. 1990). Two deer carcasses were found on the site during the 1985 reading. Pellet group data taken along the study site baseline in 1998 and 2003 estimated 56 deer and 8 cow days use/acre (138 ddu/ha and 20 cdu/ha) and 71 deer and 4 cow days use/acre (175 ddu/ha and 9 cdu/ha) respectively. In 2003, deer use appeared to be evenly split between winter and spring.

Soils are derived from sandstone parent material which is found in the profile and scattered over the surface. Effective rooting depth was estimated at just over 13 inches. The upper layers of the profile are also very rocky as shown by penetrometer readings along the baseline. Soils are sandy clay loam in texture and slightly acidic (pH of 6.3). Phosphorus may be limiting to plant development at 7.6 ppm where 10 ppm is thought to be the minimum necessary for normal plant development. An erosion condition class assessment rated soils as stable in 2003. Cover from vegetation and litter is sufficient to slow erosion. Average soil temperature was measured at 73°F in 2003 indicating a dry soil profile.

A good variety of browse is growing on the site, but only mountain big sagebrush is abundant enough to be considered a key species. The chaining has become dominated by juniper and needs to be retreated to increase productivity. Point quarter data estimated an average of 360 juniper trees/acre in 1998 and 2003. Fifteen percent of the trees sampled were “chained-over” trees which were still living. Juniper provided 45% of the browse cover in 1998 increasing to 61% in 2003. Canopy cover of juniper averaged 17% in 1998 and 24% in 2003. This much canopy cover can depress understory production, especially during long periods of drought. Eighty-five percent of the trees sampled in 2003 were in the 4-12 foot tall range.

Mountain big sagebrush, cliffrose, and bitterbrush are the preferred browse species. Big sagebrush is the key species on this site due to its abundance. With the original smaller sample used in 1985 and 1991, mountain big sagebrush density was estimated at 13,600 and 7,400 plants/acre respectively. The population was almost entirely young plants in 1985. The much larger sample used in 1998 and 2003 more accurately estimates shrub populations with clumped and discontinuous distributions. Density was estimated at 1,640 in 1998 and 1,300 plants/acre in 2003. The proportion of young plants in the population has steadily decreased with each reading. No young were sampled in 2003. Conversely, percent decadence has steadily increased with each successive reading. More than half (57%) of the big sagebrush sampled in 2003 were classified as decadent. Vigor declined in 2003 with 28% of the population being rated as poor. Utilization on mountain big sagebrush has been light to moderate in all years. In 2003, annual sagebrush leaders averaged only 1 inch of growth in June 2003.

Cliffrose and bitterbrush provide additional palatable forage for wintering deer, although these species occur in low densities. Both species had densities around 100 plants/acre in 2003. Use on cliffrose has been light to moderate. Yet bitterbrush has shown very little use in all years except 1998 when this species was moderately browsed. In 2003, 83% of the cliffrose population was classified as decadent. Prior to 2003, both cliffrose and bitterbrush displayed good vigor with no decadent plants in either population. Both bitterbrush and cliffrose were noted as having abundant leaders and flowers in 2003. Average annual leader growth was 2.1

inches for bitterbrush and 3 inches for cliffrose in June of 2003. Broom snakeweed was abundant in 1985, but has steadily declined since with the dry conditions with only 20 plants/acre estimated in 2003.

The herbaceous understory at this site has decent diversity but only fair production. As a group, perennial grasses have remained stable over all readings. Crested wheatgrass, bluebunch wheatgrass, and Sandberg bluegrass are the primary species. Several other perennial grasses are present on the site but have only been sampled in a quadrat or two in all surveys. Cheatgrass is present in the understory but it does not dominate this site as at other studies in the Fillmore unit. Cheatgrass significantly decreased in nested frequency in 2003, but was still sampled in more than half of the quadrats. The forb component has been sparse in all readings. Annual species by far outnumber perennial forms with pale alyssum being the most abundant.

1985 APPARENT TREND ASSESSMENT

Due to the low rate of erosion and healthy vegetation and litter cover, soils appear to be stable. The increase of junipers could indicate a slow downward vegetation trend, although the area should continue to provide a good quality and quantity of browse for at least 10 or more years. The key species are vigorous and the current amount of hedging appears sustainable.

1991 TREND ASSESSMENT

The basic cover values indicate a stable condition, with basal vegetative cover fairly high at 12% and percent bare ground at 15%. The mountain big sagebrush population has decreased by 46%, but much of this decline was because of the excessively large young age class (96%) in 1985. It is now at a more healthy density of 7,399 plants/acre. Cliffrose and bitterbrush are stable. Broom snakeweed has declined by 70%. Trend for key browse is considered stable. The herbaceous understory is stable. Two grasses, crested wheatgrass and bluebunch wheatgrass, are doing well. There are not many forbs on the site, but this appears normal for this herd unit.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

1998 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1991. Trend for the key browse species is down slightly. Changes in density of sagebrush and cliffrose are mostly due to the much larger sample used in 1998. However, biotic potential and the proportion of young plants in the populations of these species is low and declining. Percent decadence and the proportion of plants displaying poor vigor have both increased within the sagebrush population. The larger sample used in 1998 picked up a few bitterbrush that were not previously sampled. They appear to be stable, moderately browsed, and in good vigor. Juniper trees are abundant with an estimated density of 367 trees/acre (point quarter data). Overhead canopy cover varies on the site, but the average is 17%. It appears that the increasing juniper cover may be negatively affecting the sagebrush. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses slightly increased. Perennial forbs are still lacking.

TREND ASSESSMENT

soil - stable (3)

browse - slightly downward (2)

herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is slightly down. Vegetation and litter cover both slightly declined in 2003, while bare soil increased to 27%. Erosion remains low, but the dominance of juniper in the overstory appears to be limiting understory abundance and may result in less vegetation and litter cover in the future. Trend for browse is slightly down. Mountain big sagebrush density decreased by 21%, poor vigor increased from 11% to 28%, percent decadence increased from 18% to 57%, and no young plants were sampled in 2003. Eighty-three percent of the cliffrose were also classified as decadent. These negative parameters associated with the key browse species are likely the result of drier conditions compared to 1998 as well as a highly competitive environment resulting from the dominance of juniper on the site. The herbaceous understory is stable, but remains in only fair condition with few abundant perennials. This site would be a good candidate for treatment to reduce juniper and increase the productivity of the key browse and herbaceous species.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Management unit 21 , Study no: 14

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	_a 101	_{ab} 111	_b 147	_a 92	7.93	2.69
G	Agropyron smithii	-	2	-	3	-	.15
G	Agropyron spicatum	_b 102	_{ab} 89	_{ab} 66	_a 58	2.36	1.71
G	Bouteloua gracilis	3	-	-	-	-	-
G	Bromus japonicus (a)	-	-	6	5	.03	.03
G	Bromus tectorum (a)	-	-	_b 191	_a 142	2.62	1.34
G	Festuca myuros (a)	-	-	-	3	-	.00
G	Poa bulbosa	-	-	-	4	-	.06
G	Poa fendleriana	-	3	1	2	.03	.00
G	Poa secunda	_a 15	_a 31	_a 31	_b 85	.39	1.08
G	Sitanion hystrix	13	3	5	6	.21	.01
G	Vulpia octoflora (a)	-	-	_b 12	_a -	.05	-
Total for Annual Grasses		0	0	209	150	2.70	1.38
Total for Perennial Grasses		234	239	250	250	10.93	5.73
Total for Grasses		234	239	459	400	13.64	7.11

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
F	Alyssum alyssoides (a)	-	-	_b 222	_a 158	2.38	.77
F	Allium spp.	-	-	-	10	-	.01
F	Arabis spp.	-	2	2	1	.03	.00
F	Astragalus spp.	-	-	-	-	.00	-
F	Calochortus nuttallii	-	5	-	2	-	.00
F	Collinsia parviflora (a)	-	-	_a -	_b 20	-	.04
F	Cryptantha spp.	-	-	3	-	.15	-
F	Descurainia pinnata (a)	-	-	5	3	.04	.00
F	Draba spp. (a)	-	-	13	14	.04	.03
F	Galium spp.	-	-	-	6	-	.02
F	Holosteum umbellatum (a)	-	-	_a 11	_b 29	.02	.14
F	Microsteris gracilis (a)	-	-	_b 21	_a 5	.04	.01
F	Phlox longifolia	-	3	-	3	-	.01
F	Plantago patagonica (a)	-	-	3	-	.00	-
F	Ranunculus testiculatus (a)	-	-	_a 2	_b 32	.01	.11
F	Tragopogon dubius	6	-	-	-	-	-
F	Unknown forb-perennial	2	-	-	-	-	-
F	Zigadenus paniculatus	-	3	-	-	-	-
Total for Annual Forbs		0	0	277	261	2.54	1.13
Total for Perennial Forbs		8	13	5	22	0.19	0.05
Total for Forbs		8	13	282	283	2.74	1.19

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 21 , Study no: 14

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia tridentata vaseyana	45	44	8.82	7.20
B	Chrysothamnus nauseosus hololeucus	7	1	1.67	.03
B	Cowania mexicana stansburiana	2	3	1.62	.59
B	Gutierrezia sarothrae	10	1	.01	-
B	Juniperus osteosperma	16	20	12.07	14.86
B	Opuntia spp.	1	1	-	-
B	Purshia tridentata	2	2	.15	.63
B	Quercus gambelii	6	5	2.38	1.14
Total for Browse		89	77	26.76	24.46

CANOPY COVER, LINE INTERCEPT --

Management unit 21 , Study no: 14

Species	Percent Cover	
	'98	'03
Artemisia tridentata vaseyana	-	5.09
Chrysothamnus nauseosus hololeucus	-	.10
Chrysothamnus viscidiflorus stenophyllus	-	.01
Cowania mexicana stansburiana	-	2.70
Juniperus osteosperma	17.00	24.29
Opuntia spp.	-	.03
Purshia tridentata	-	.21
Quercus gambelii	-	2.70

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 21 , Study no: 14

Species	Average leader growth (in)
	'03
Artemisia tridentata vaseyana	1.0
Cowania mexicana stansburiana	3.0

POINT-QUARTER TREE DATA --

Management unit 21 , Study no: 14

Species	Trees per Acre		Average diameter (in)	
	'98	'03	'98	'03
Juniperus osteosperma	367	354	3.6	6.4

BASIC COVER --

Management unit 21 , Study no: 14

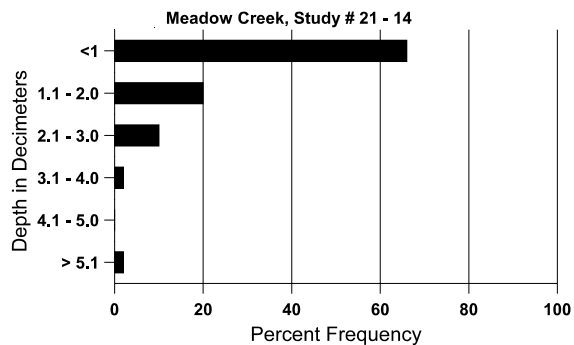
Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	11.00	11.75	42.72	35.57
Rock	3.75	4.50	5.43	4.32
Pavement	4.25	6.50	6.07	2.23
Litter	63.50	61.25	55.46	49.52
Cryptogams	2.25	1.00	3.31	.81
Bare Ground	15.25	15.00	18.19	26.92

SOIL ANALYSIS DATA --

Management unit 21, Study no: 14, Study Name: Meadow Creek

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
13.2	73.0 (8.7)	6.3	58.0	17.4	24.6	2.4	7.6	118.4	0.8

Stoniness Index



PELLET GROUP DATA --

Management unit 21 , Study no: 14

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	46	11	-	-
Deer	22	16	56 (138)	71 (175)
Cattle	1	3	8 (20)	4 (9)

BROWSE CHARACTERISTICS --
Management unit 21 , Study no: 14

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata vaseyana</i>											
85	13600	1666	13000	600	-	-	.98	0	0	0	15/18
91	7399	-	1600	5333	466	-	10	7	6	4	6/6
98	1640	20	80	1260	300	440	15	2	18	11	25/37
03	1300	-	-	560	740	420	14	2	57	28	22/32
<i>Cercocarpus montanus</i>											
85	66	-	-	66	-	-	0	100	-	0	25/30
91	66	-	66	-	-	-	0	100	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	88/83
<i>Chrysothamnus nauseosus hololeucus</i>											
85	865	-	66	266	533	-	54	0	62	15	13/16
91	333	-	-	-	333	-	40	0	100	60	-/-
98	160	-	20	20	120	20	0	0	75	38	27/35
03	20	-	-	-	20	20	0	0	100	100	23/10
<i>Chrysothamnus viscidiflorus stenophyllus</i>											
85	332	-	66	200	66	-	0	0	20	20	8/13
91	465	-	66	333	66	-	0	0	14	0	14/12
98	0	-	-	-	-	-	0	0	0	0	-/-
03	0	-	-	-	-	-	0	0	0	0	10/12
<i>Cowania mexicana stansburiana</i>											
85	199	-	66	133	-	-	67	33	0	0	20/28
91	199	-	133	66	-	-	67	0	0	0	35/39
98	40	-	20	20	-	40	0	0	0	0	55/63
03	120	-	-	20	100	-	17	0	83	17	67/64
<i>Ephedra viridis</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	26/71
<i>Gutierrezia sarothrae</i>											
85	6999	400	2466	4133	400	-	0	0	6	.95	8/9
91	2132	-	200	1666	266	-	0	0	12	3	8/7
98	260	20	20	240	-	-	0	0	0	0	6/7
03	20	-	-	20	-	20	0	0	0	0	8/10

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Juniperus osteosperma											
85	466	-	200	266	-	-	0	0	-	0	64/69
91	533	-	133	400	-	-	13	0	-	13	121/91
98	380	-	80	300	-	60	0	0	-	0	-/-
03	500	-	-	500	-	-	0	0	-	0	-/-
Opuntia spp.											
85	532	-	200	66	266	-	0	0	50	38	5/9
91	466	66	200	266	-	-	0	0	0	0	3/4
98	20	-	-	20	-	-	0	0	0	0	8/13
03	20	-	-	20	-	-	0	0	0	0	7/14
Purshia tridentata											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	60	-	-	60	-	-	100	0	-	0	35/58
03	100	-	-	100	-	40	0	0	-	0	28/42
Quercus gambelii											
85	0	-	-	-	-	-	0	0	0	0	-/-
91	0	-	-	-	-	-	0	0	0	0	-/-
98	780	-	360	420	-	-	0	0	0	0	43/29
03	800	-	180	580	40	-	0	0	5	0	35/26